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10/587,442	08/15/2007	Joseph M. Amato	US03 0291 US2	2720

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EXAMINER

HOQUE, FARHANA AKHTER

ART UNIT	PAPER NUMBER
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2831

NOTIFICATION DATE	DELIVERY MODE
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02/01/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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ip.department.us@nxp.com

Office Action Summary	Application No. 10/587,442	Applicant(s) AMATO, JOSEPH M.	
	Examiner FARHANA HOQUE	Art Unit 2831	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Applicant's communication filed on 1/19/2010. In virtue of this communication, claims 1-18 are currently presented in the instant application.

Continued Examination

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 1/19/2010 has been entered.

Response to Arguments

1. Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claim 15 is objected to because of the following informalities:

Change claim 15, line 1, "The structure" to - - The method - -;

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Thomas (U.S. Patent No. 3,808,527).

With respect to claim 1, Thomas discloses a structure comprising:
at least one proportional variable resistor suitable for electrically measuring unidirectional misalignment of stitched masks in etched interconnect layers, said variable resistor comprising (Fig. 1):
at least a first mask (Fig. 4) and a second mask (Fig. 2) that when superimposed comprise at least two test pads [2-5] (see Fig. 1) and two interconnects [12, 66] (see Fig. 4), wherein the two test pads [2-5] (see Fig. 1) are both formed by the first mask (Fig. 4), wherein a resistance between the test pads is dependent on a distance along the interconnects [12, 66] (see Fig. 4) between the test pads [2-5] (see Fig. 1), and the resistance is indicative of the misalignment of the first and

second masks (col. 4, line 56-col. 5, line 21).

With respect to claim 2, Thomas discloses the structure according to claim 1 wherein the variable resistor (see Fig. 1) comprises a directly proportional variable resistor which exhibits an increased resistance based on a greater distance between the test pads [2-5] (see Fig. 1; also col. 4, line 56-col. 5, line 21).

With respect to claim 3, Thomas discloses the structure according to claim 1 wherein the variable resistor comprises an inversely proportional variable resistor (Fig. 1) which exhibits a decreased resistance based on a greater distance between the test pads [2-5] (see Fig. 1; also col. 4, line 56-col. 5, line 21).

With respect to claim 4, Thomas discloses the structure according to claim 1 wherein the interconnects comprise at least one stick type interconnect [12, 66] (see Fig. 4) of a substantially rectangular geometry (Fig. 4).

With respect to claim 5, Thomas discloses the structure according to claim 1 wherein the interconnects comprise at least one hook type interconnect, wherein the hook type interconnect comprises:
an intermediate portion which is non-linear [12, 66] (see Fig. 4) within a plane of

the corresponding mask (Fig. 4); and two ends separated by the intermediate portion, wherein both of the ends extend from the intermediate portion in substantially the same direction (Fig. 4).

With respect to claim 6, Thomas discloses a system for electrically measuring unidirectional misalignment of stitched masks in etched interconnect layers, said system comprising:
at least one proportional variable resistor comprising:
a reference mask (Fig. 4) comprising at least two test pads [2-5] (see Fig. 1) and at least one interconnect [66] (see Fig. 4); and
a second mask comprising (Fig. 2) at least one interconnect [12] (see Fig. 2), wherein a resistance [ABSTRACT] between the test pads [2-5] (see Fig. 1) is dependent on a distance along the interconnects between the test pads [2-5] (see Fig. 1); and a probe [78, 80] (see Fig. 1) for testing the resistance between the test pads along said interconnect of said reference mask (Fig. 4) and said interconnect of said second mask (Fig. 2) when said masks are superimposed (col. 4, lines 15-22).

With respect to claim 7, Thomas discloses the structure according to claim 6, the at least one interconnect [66] (see Fig. 4) of said reference mask comprising at least one stick type interconnect of a substantially rectangular geometry (Fig. 4).

With respect to claim 8, Thomas discloses the structure according to claim 6, the at least one interconnect [66] (see Fig. 4) of said reference mask comprising at least one hook type interconnect, wherein the hook type interconnect comprises:

an intermediate portion which is non-linear [12, 66] (see Fig. 1) within a plane of the corresponding mask (Fig. 4); and two ends separated by the intermediate portion, wherein both of the ends extend from the intermediate portion in substantially the same direction (Fig. 4).

With respect to claim 9, Thomas discloses the structure according to claim 6, the at least one interconnect [12] (see Fig. 2) of said second mask comprising at least one stick type interconnect of a substantially rectangular geometry (Fig. 2).

With respect to claim 10, Thomas discloses the structure according to claim 6, the at least one interconnect of said second mask comprising at least one hook type interconnect [12] (see Fig. 2), wherein the hook type interconnect comprises:

an intermediate portion which is non-linear [12, 66] (see Fig. 1) within a plane of the corresponding mask (Fig. 2); and two ends separated by the intermediate

portion, wherein both of the ends extend from the intermediate portion in substantially the same direction (Fig. 2).

With respect to claim 11, Thomas discloses the structure according to claim 6, wherein the variable resistor (Fig. 1) comprises an inversely proportional variable resistor which exhibits a decreased resistance based on a greater distance between the test pads [2-5] (see Fig. 4; also col. 4, lines 56-col. 5, lines 21).

With respect to claim 12, Thomas discloses the structure according to claim 6, wherein the variable resistor comprises a directly proportional variable resistor which exhibits an increased resistance based on a greater distance between the test pads (col. 4, line 56-col. 5, line 21).

With respect to claim 13, Thomas discloses a method of measuring stitched mask misalignment in etched interconnect layers, the method comprising: providing a reference mask (Fig. 4) comprising at least two test pads [2-5] (see Fig. 4); providing a second mask (Fig. 2) comprising at least one interconnect [12] (see Fig. 2); superimposing said reference mask (Fig. 4) and said second mask (Fig. 2) to provide at least one proportional variable resistor (Fig. 1) between the test pads [2-5] (see Fig. 4) over the interconnect of the second mask (Fig. 2), wherein the resistance between the test pads is dependent on a

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distance along the interconnect between the test pads [2-5] (see Fig. 4; also col. 4, line 56-col. 5, line 21); and
electrically measuring the resistance of said at least one proportional variable resistor [ABSTRACT].

With respect to claim 14, Thomas discloses the method according to claim 13 further comprising establishing an optimum resistance between said test pads [2-5] (see Fig. 4), wherein the optimum resistance corresponds to a configuration in which the reference mask (Fig. 4) and the second mask are aligned (Fig. 2).

With respect to claim 15, Thomas discloses the structure according to claim 14 further comprising:
comparing the measured resistance to said optimum resistance; and
adjusting the position of said masks to alignment (col. 5, lines 19-27).

With respect to claim 16, Thomas discloses the structure according to claim 1, further comprising an electrical contact to electrically couple between the two interconnects (col. 4, lines 2-4), wherein the resistance between the test pads is further dependent on a distance along the electrical contact between the two interconnects [ABSTRACT].

With respect to claim 17, Thomas discloses the structure according to

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claim 16, wherein the electrical contact (col. 4, lines 2-4) is formed as part of the first (Fig. 4) and second masks (Fig. 2) on the same mask as at least one of the interconnects [12, 66] (see Fig. 1).

With respect to claim 18, Thomas discloses the structure according to claim 1, wherein the variable resistor is formed by at most two layers comprising the first (Fig. 4) and second masks (Fig. 2).

Citation of Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ausschnitt (U.S. Patent No. 4,437,760) discloses a reusable electrical overlay measurement circuit and process.

Chow (U.S. Patent No. 4,571,538) discloses a mask alignment measurement structure for semiconductor fabrication.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to FARHANA HOQUE whose telephone number is (571)270-7543. The examiner can normally be reached on Monday - Friday 8:30-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/FARHANA HOQUE/
Examiner, Art Unit 2831

/Timothy J. Dole/
Primary Examiner, Art Unit 2831